Silk Association of India (SAI)
NEWSLETTER

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From the Vice President's Desk.....

Research Needs and Priorities of the Mulberry Silk Industry

Because of effective technologies developed by different research institutions, good progress has been achieved in sericulture resulting in productivity and quality improvement of mulberry raw silk. However, the country is still importing at least 30% (both from official and unofficial channels) to meet the internal demand for quality raw silk. Some of the issues such as the production of uniform quality cocoons, reducing production cost; climate management especially during silkworm rearing and spinning; effective utilization of by-products; Pebrine detection and management; easy and quick method for sex separation at cocoon/pupal stage; mitigating abiotic stress; overcoming depleting soil health and fertility; alternate cropping models for sustainable income of especially, small and marginal farmers; dependency on labor and high production cost, etc., are still affecting quality and cost of products in the silk production chain. In this backdrop, following research gaps needs immediate attention and redressal by the researchers to come out with acceptable and economically viable technologies.

- Soil organic carbon and in turn the micronutrient levels are reaching alarmingly low levels. Research efforts need to be geared up for the substitution of organic carbon from different sources on a war footing basis to maintain the required levels of these inputs. The use of microbial consortia for the conversion of mulberry waste into organic manure also deserves attention
- During the last two years, the infestation rate of mulberry pests namely, thrips and aphids have been reported to have reached a devastating level and resulted in heavy leaf yield loss, thus reducing farmers' income to great extent. Similarly, the infestation level of leaf roller and root rot in mulberry is also crossing the threshold level. Hence, effective control methods of leaf roller, root rot, aphids, and thrips need to be developed, failing which, farmers will be put to heavy economic loss
- Presently, the industry mostly depends on one bivoltine double hybrid combination and CSR2 to produce Cross Breed eggs in Southern India, which is a cause of concern. Hence, the development of more double hybrids, besides developing alternate male parents and also exploring the possibility of using male component (FC2) as a supplement to CSR2 for crossbreed egg production is another aspect of very high priority to be considered
- Scientific maintenance of parental breeds (One way multiplication system) confirming to parental characteristics by qualified breeders has to be ensured at all the four levels of basic stock maintenance and multiplication

- More research emphasis on the mounting of mature larvae, new mountages, and climate management, especially humidity during cocooning shall receive high priority to minimize variation in cocoon shape size, etc., so that majority of bivoltine cocoons shall result in high-quality silk
- Easy and quick method for cocoon/pupa level sex separation, Pebrine detection & Flacherie management are yet other issues on which researchers shall concentrate to ensure higher crop success
- Specific research programs for utilization of defective cocoons, pupa, cut cocoons, sericin, silk waste, etc., are also of high priority to add value to by-products indigenously and widen profit margin rather than allowing them to be exported to China
- Non textile uses of silk and by-products for the bio-medical and cosmetics industry must receive sufficient attention
- Strategizing approaches to produce substantial quantum of high-grade silk in larger lots to bringdown the import of raw silk and ultimately make India to become an exporter of raw silk is yet another priority area
- Indigenously developed ARMs must be the priority aspect for converting all good quality cocoons rather than using them on cottage basins etc.,
- Development of suitable machines and appliances in all the three major areas of operation namely mulberry cultivation, silkworm rearing, and post cocoon sector to reduce labor dependency and bring down the cost of production
- Development of different integrated farming models to suit especially the small and marginal farmers for sustainable income
- Periodical and nearly correct assessment of demand and supply gap for raw silk as well as market information research are lacking and the same needs to be attended
- Research on socio-economic aspects and impact assessment of technologies to suggest the mid-term correction is rather very much neglected and should receive higher priority.

The need for strengthening, reorientation, and coordination in sericulture research

More number of sericulture research institutes namely, Karnataka State Sericulture Research and Development Institute (KSSRDI) Thalaghatpura (Govt. of Karnataka), Central Sericulture Research and Training Institute (CSRTI), Mysuru; Central Silk Technological Research and Training Institute (CSTRI), Bengaluru; National Silkworm Seed Organization, Silkworm seed technology Laboratory Bengaluru (Central Silk Board), Andhra Pradesh State Sericulture Research and Development Institute (APSSRDI), Hindupur, AP., Agriculture Universities etc., are engaged in silk research and training. Most of these institutions are concentrated in Karnataka and adjoining states. However, in all the above research institutions, there is an acute shortage of manpower to carry out research on the identified research projects. Besides, frequent changes in the head of the organization also adversely affect the progress of research. It is also reported that the allocation of funds for sericulture is also getting reduced in recent years, which also warrants urgent attention. Further, the necessity of bringing coordination among all these research institutions is also of utmost importance. Hence, DOS Karnataka, Andhra Pradesh, Tamil Nadu, West Bengal etc., and Central Silk Board shall jointly pay immediate attention to all the above aspects and think of bringing good coordination and understanding among all these institutions to avoid duplications and synergies of the research for solving field problems being faced by different stakeholders in the production chain.

Dr. S.B. Dandin

Farmers' Produce Organizations - A Vital Tool for Effective Transfer of Technologies in Sericulture

Dr. S.B. Dandin

Introduction

Agriculture is the mainstay of the Indian socio-economy where more than 60 percent of the population derive their livelihood from different land-based activities. Sericulture is one of the land-based activities and more than eight million people depend on this activity directly or indirectly for their employment and income. India is the second-largest producer of raw silk next only to China and the only country that produces all the five types of natural silks. In spite of good progress made in the production and quality of raw silk, it could not become self-sufficient in its quality silk requirement for the power loom sector. Of late, sericulture is becoming less and less attractive to the younger generation mainly because of the following reasons.

1. Fast degradation of natural resources i.e., soil, water, and air besides climate change effects

2. High cost and uncertain availability of quality inputs including certified silkworm eggs
3. Non-availability of farm laborers due to mass migration of young people from rural to urban
4. Acute shortage of energy for irrigation
5. Emergence of new pests and diseases
6. Inadequate extension supports to reach the unreached and last-mile farmers.

Another important aspect is land fragmentation and an increase in the number of small and marginal farmers. Presently, 85 percent of farmers occupy 40% of the land with small and marginal landholdings and contribute to 56% of the total produce. Small and marginal farmers lack capital investment capability besides the poor bargaining capacity. Their access to improved technology is rather limited hence, improved technologies are away from their easy reach. Because of the small number of products with quality variation, they fail to get a good price in the market as most of the markets are predominantly the buyer's markets. To mitigate this distress situation and make the farmers free from the clutches of market uncertainties, the government of India is trying to bring some reforms to make the farming community stronger besides doubling their income. Out of several measures and options considered by the policymakers, the necessity of grouping the farmer producers in to commodity/community groups is very much felt. This is mainly because the aggregation has an important role to play and different tools of aggregation like Cooperatives, FPC, SHG, CIG, FIG, etc. are available. This approach also brings professionalism in agribusiness. Hence the Farmers Produce Company / Farmers Produce Organization (FPC/FPO) came into being.

Concept and objectives of FPO's

The concept of producer companies was introduced in 2002 by incorporating a new Part IXA into the Companies Act. The main aim of the formation of FPC is to establish basic business principles within farming communities, to bring industry and agriculture closer, and to boost rural development by collectivization of the farmer's especially small and marginal farmers. An amendments in Company's Act 2002 was done on the recommendation of Prof. Y.K. Alagh Committee (1998) to add a corporate muscle to cooperatives so that it can bring effective management and good governance. The same provisions have been retained for FPC after re-visiting the Companies Act, in 2013 (FPO policy and process guidelines). Provision is also provided for conversion of existing cooperatives into companies. It also ensures unique elements of cooperative spirit and business with a regulatory framework of companies. The principles behind the successful working of FPO are, group coherence; financial health; entrepreneurship; knowledge and understanding of farming practices and sustainability and enhanced farmers income. The important activities and forward steps being envisaged under the scheme for sericulture are

1. Enhance scales of economy
2. Procure inputs at a lower price and distribute to all the members
3. Enable aggregation, sorting and grading of produce besides
4. Post-harvest processing and value addition wherever possible
5. Derive more holding capacity / bargaining & selling power
6. Access to timely and adequate finance
7. Access to technology and Training for all member farmers
8. Market linkages and arranging buyers-sellers meeting
9. Establishing organic link between the government and the stakeholders.

Organizational details

There are about 6894 FPOs functioning in different departments of agriculture in the country including sericulture in the year 2019. 500-1000 farmers who are the primary agriculture producers involved in production of a particular product or group of products come together and form FPOs. Sometimes few Farmer's Interest Groups (FIG) may also come together and form a FPO. Initially all member farmers contribute Rs.1000/- as a share and this forms an initial capital. ALL the producers thus enrolled as members elect 10-15 members among them selves as Board of Directors (BOD) and in turn these BOD members elect one of them as Chairman. To manage the day-to-day activities, one Chief Executive officer (CEO), one assistant and one helper are appointed. The conceptualized picture is shown (Fig. 1). Board of directors meet regularly to discuss the implementation of the envisaged activities, progress made, schedule of activities, financial details etc. CEO is made responsible for account keeping, disbursal of dividends, payments of fees, auditing the accounts etc.

Small Farmers Agri-Business Consortium SFAC provides one time matching equity grant up to maximum of Rs. 10 lakh (one million) to the FPCs to enhance borrowing power, and thus enables the entities to access bank finance. Government of India will pay a seed money equal to the share amount limiting to the maximum ceiling limit of Rs.15,00,000. National Bank for rural development (NABARD) and SFAC are identified as nodal agencies through which all the government support is being channelized to FPOs. Mainly two types of support is available to FPOs. SFAC operates a Credit Guarantee Fund to mitigate credit risks of financial institutions which lend to FPOs (registered as Producer Company

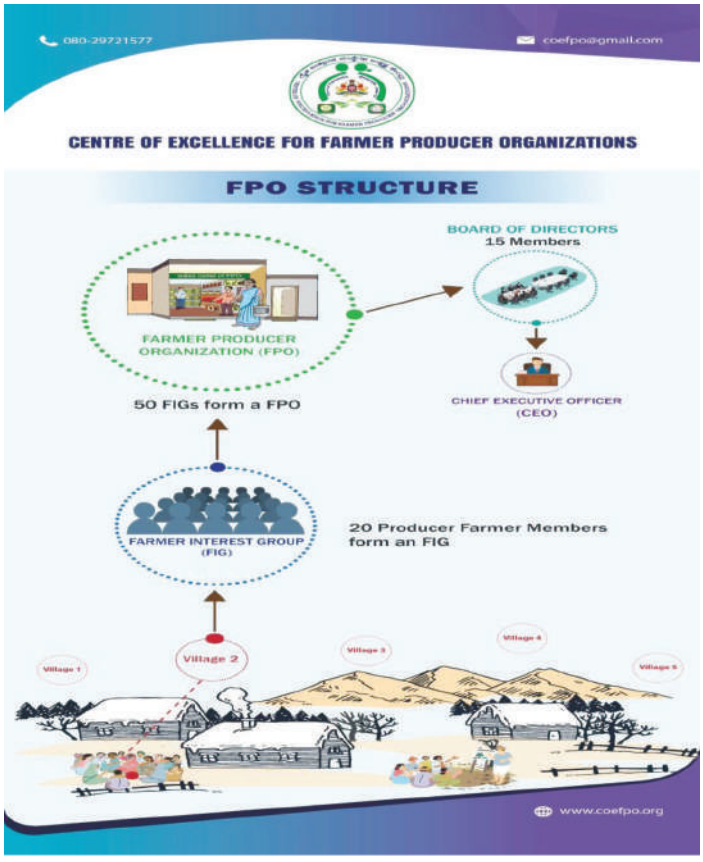

Fig.1. Organizational chart of model FPO

under Part IX-A of Companies Act) without collateral security. This helps FPOs to access credit from mainstream financial institutions for establishing and operating businesses. Resource Institutions (RI) are identified and trained by the government which are helping the FPOs to function as per the bye laws of the Societies Act. Respective state departments will extend financial assistance up to Rs 25,00,000/-(Rs.2.5 Million) for the initial period of three years as seed money to meet salary of staff ,exposure visits, trainings etc.

Functions and responsibilities

FPOs have to undertake following activities for the benefit of member sericulturists

- Raising nursery and providing planting material of improved mulberry varieties
- FPO's may establish egg production center to produce and distribute quality Bivoltine silkworm eggs to the chawki centers/ farmers directly
- Running chawki rearing centers to rear young silkworms up to second instar and distribute worms
- Procurement and distribution regularly used inputs
- Arrange disinfection of rearing houses of all the member producer farmers
- Arrange crop inspection as and when required and give suitable advices
- Run custom hired centers and provide mechanization services to all the needy
- Dissemination of technology and innovations through regular training programmes and workshops
- Primary processing like drying, cleaning, grading and Quality control
- Aggregation and storage of cocoons if required
- Brand building, Packaging, Labeling and Standardization
- Dissemination of market information
- Participation in commodity exchanges and export
- Act as a viable link between department of sericulture/Central Silk Board and member farmers to facilitate easy and timely flow of government subsidies and benefits/incentives
- Such other activities in the value chain of the produce, right from procurement of raw material to delivery of the final product at the ultimate market place or consumers' doorstep (Fig. 2).

Department of Sericulture, Govt of Karnataka in coordination with Central Silk Board has established 12 FPOs in eight clusters of Karnataka by grouping 600-1000 sericulture farmers spread over 5-6 villages situated nearby villages in the form of cluster and enrolled them as primary members by collecting a share amount of Rs.1000/- each. FPOs formed are registered as a society under the societies Act. 10-15 Board of directors are elected among them to monitor and coordinate the envisaged activities.

Conclusion

The concept of establishing Farmer Produce Organizations though is a new concept, is gaining momentum among many agriculture/ sericulture farmers of the country because of the multiple benefits

Fig. 2. Activities of Sericulture FPOs

it offers to members . As the scheme is new, there is no uniformity in modalities and application of rules and regulations. State Departments are following different rules to suit their conveniences which is creating confusion among the stake holders. Many of the farmer groups are coming forward to start FPO's, without much experience and they lack adequate know- how and do-how. Hence thorough training is a prerequisite for the board of directors of new FPO's. Similarly resource institutions and promoting organizations also need exposure to various implementation modalities. There is a need for strengthening working relation between FPO's and Government organizations. Since FPO's are working for the benefit of producer members, concerned Government department need to extend all financial benefits and subsidies through these FPO's. In many of the line departments, there is an acute shortage of extension manpower. Hence, presence of FPO's can be effectively used for transfer of technologies. An annual meeting of Board of Directors of all the FPO's is desirable for sharing experiences, exchange of new thoughts and suggest corrective measures for improving their functioning to meet the aspirations of the member producers. Finally it is felt that, all the sericulture FPO's going to be formed, shall be aggregated in to a federation to improve their functioning and empowerment.

Research Brief

Identification of the Major Allergenic Proteins from Silkmoth Involved in Respiratory Allergic Diseases

Dr. H.K. Basavaraja and Dr. B.S. Angadi

Silkmoths are a significant source of indoor and outdoor aeroallergens. Workers in seed production units are sufferers. Similarly, people working in silkworm rearing also suffer allergic reactions especially, at cocooning time. Central Silk Board had appointed an expert committee to examine and suggest measures to reduce the suffering of workers.

High prevalence of IgE-mediated sensitization was demonstrated in a group of patients with allergic respiratory diseases. There are no studies on adult stage of these moth species allergens involved in allergic respiratory reactions. That is the aim of this study by researchers, Laura ML Araujo et al., from Brazil.

The study

Thirty six participants were included in an experimental study, submitted to skin prick test with *Bombyx mori* wing extract and six other common allergens, as well as Western blot analysis with incubated nitrocellulose membrane impregnated with silkmoth extract and human IgE-antibody. The participants were divided into three groups viz., 1) 21 allergic patients whose skin prick test was positive to *Bombyx mori* wing extract; 2) 8 allergic patients whose skin prick test was positive to mite and negative to *Bombyx mori* extract and 3) 7 negative non-allergic subjects.

Results

Among the 21 participants from group 1, 19 serum samples reacted to *Bombyx mori* extract by Western blot. All of them reacted to a protein at 80 kDa and 5 other proteins (66, 50, 45, 37 and 30 kDa) were identified in more than 50% of the individuals tested, considered as major allergenic proteins. Sera from 7 out of 8 patients sensitized to house dust mite demonstrated IgE-reactivity to *Bombyx mori* extract by Western blot analysis. Serum samples from healthy participants did not react at all.

Conclusion

Six major reactive proteins by immunoblot analysis from moth's wings sensitized patients can be potential allergens. The one at 80 kDa is the major protein, seen in all IgE-reactive patients from group 1 and in none from group 2, yet to be identified. Future studies should be conducted to better characterize these proteins.

In another Chinese study, the specific IgE antibodies to moth (*Bombyx mori*) and midge (Chironomus yoshimatsui) were measured by the Pharmacia CAP system in 51 house-dust-mite-sensitive asthma patients. None of these patients had definite histories of exposure to these insects are apparent evidence of insect-induced asthma symptoms. The RAST-inhibition assay was performed to investigate cross-allergenicity between these two insects. Further more, IgE immunoblotting was done to study the IgE-binding components in moth and midge extracts. Thirty(59%) of these patients showed positive IgE antibodies to moth, while twenty five(49%) showed positive IgE antibodies to midge. Those frequencies of positivity were like that for Japanese cedar pollen, which is well known to cause allergy.

One study, by Baoqing Sun et al., reports, in Southern Chinese patients with allergic diseases, the authors showed a high prevalence of sensitization to silkmoth and a co-sensitization between silkmoth and other 5 common inhalant allergens. Further, serum inhibition studies are warranted to verify whether cross-reactivity exists among these allergens.

(Source: The main paper discussed was reported in Allergologia Immunopathol(Madr) Nov-Dec. 2020; 48(6):597-602)

Soil Sampling Procedure for Nutrient Analysis in Mulberry Gardens

Dr. E. Muniraju

Soil testing in mulberry gardens is the most important practice to manage required fertilizer application to enhance production of quality leaf. Without soil testing, it is very difficult to ensure the right application of fertilizers dose to optimize mulberry yield. Each sample collected must be a true representative of the area being sampled. Utility of the results obtained from the laboratory analysis depend on the sampling precision. Hence, collection of large number of samples is advisable so that samples of desired size can be obtained by sub-sampling. In general, sampling is done at the rate of five samples for every plot of mulberry garden irrespective of extent of land/plot of mulberry garden to be established or from an established garden.

Benefits of soil testing in mulberry gardens

- Soil Analysis leads to more informed fertilizer application decisions, reducing risks due to soil erosion, soil infertility, and degradation of lands and increasing farm profitability in the long-term
- Reveals the amount of available macro-nutrients in the soil
- Indicates nutrients that could be mulberry leaf yield limiting also
- Monitors soil health properties such as pH, EC and OC, which affect nutrient availability to mulberry and thereby yields and profitability
- Consequently, it also provides a mulberry management tool with a potential benefit to the sericulturists of increased yields, reduced operating costs and tolerance to disease and pest damage.

The following places not to be considered for soil sample collection

- Slope places
- On bunds and sides of the bunds
- On sides of the fence
- Under the trees and shaded places
- Wet soils
- Before one month of compost and manure application
- Water canals

Points to be considered for soil sample collection

- Collect soil samples annually during the months from December to May
- Samples to be collected at least in 5 locations in each plot as shown in Fig.1 to ensure homogeneity and can be grouped into a single sampling unit

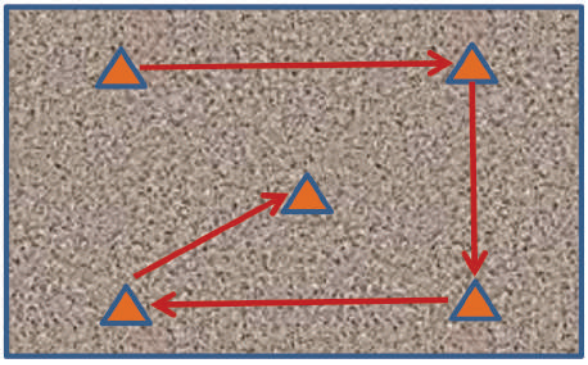

Fig. 1. Places to be selected for soil sapling in a plot/unit area of mulberry garden

- Collect soil samples up to 30 cm depth.

Procedure for soil sample collection

- Remove the surface litter at the identified soil sampling spot
- Make a 'V' shaped cut to a depth of 30 cm in the sampling spot using spade
- Remove thick slices of soil from top to bottom of exposed face of the 'V' shaped cut and place in a clean container

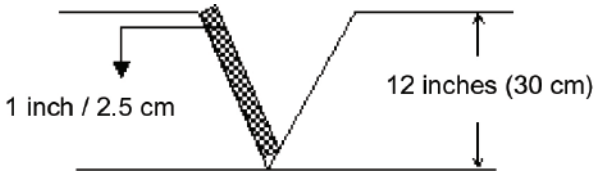

Fig. 2. Digging of 'v' shape pit for soil sample collection

- Mix the samples thoroughly and remove foreign materials like roots, stones, pebbles and gravels
- Reduce the bulk to about half to one kilogram by quartering
- Quartering is done by dividing the thoroughly mixed sample into four equal parts. The two opposite quarters are discarded and the remaining two quarters are remixed and the process repeated until the desired sample size of nearly 500g is obtained

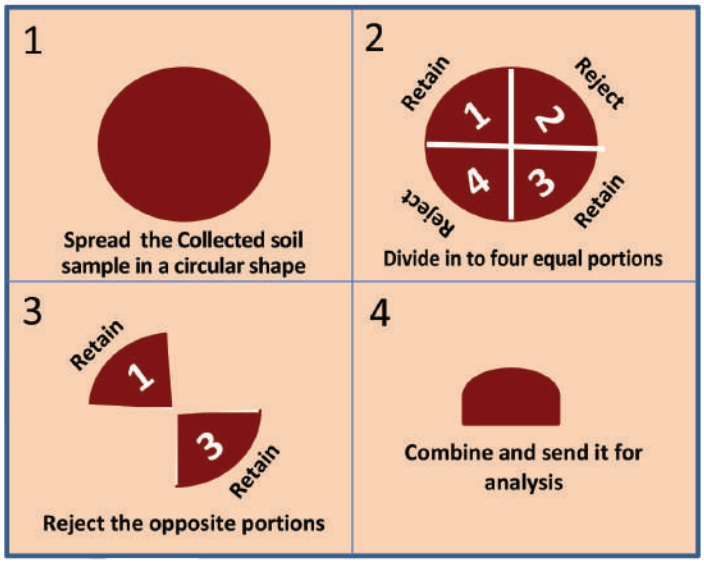

Fig. 3. Method of composite soil sample preparation

- Collect the sample in a clean cloth or polythene bag
- Label the bag with information like name of the sericulturist, address, phone number, survey number, date of soil sample collection, new garden to be established or existing garden, if it is existing age of the garden, irrigation method, name of the sampler etc.,
- Dry it in shade place and after drying mix the sample and transfer to a polythene or cloth bag and label it
- Hand over the sample to the nearest soil testing laboratory for further nutrient analysis
- Based on the soil test reports and recommendations apply manures and fertilizers for better mulberry leaf production and productivity.

Webinars conducted by SAI

M. Ramachandra Gowda and Dr. E. Muniraju

Webinar No.14: Powdery mildew disease management in mulberry (8-1-2022)

Resource person

Technical presentation by Dr. Arun Kumar, Scientist, CSRTI, Mysuru

Panel Members

Sri. M. Nagaraju, Assistant Director of Sericulture

Sri. K. S. Kumara Subramanaya, Assistant Director of Sericulture

Sri. C.P. Harish, Farmer, Malluru, Sidlghatta Tq. Chickaballapura Dt.

Sri. K. Chandrasekar, Proprietar Chawki Rearing Centre, Yerahally, Mandya Dt.,

Sri. T. Krishna, Proprietor, Chawki Rearing Centre, Palamner, Andrapradesh.

The most common causes for the occurrence of the disease are,

1. Most common during winter months
2. Closure mulberry plantations
3. Excess Irrigation or rains
4. Mulberry gardens closure to water bodies
5. Lack of weed removal
6. Lack of precautionary measures

Control Measures

- Adoption of wider space plantations
- Ensured weed control methods
- Adopting improved controlled irrigation methods
- Use of Wettable sulfur after every leaf harvest during winter
- Adopting an integrated package of practice for control of powdery mildew

Webinar No.15: Farmers Innovations for Sustainable Sericulture Part-1 (12-2-2022)

Resource person

Technical presentation by Dr. Hukkeri, Scientist, CSR&TI, Mysuru

Panel Members

Sri. Ajay Maruthi, Rearer, Haralu Machanahalli

Dr. Durga Vakkapatala, Rearer, Haveri

Sri. Nagendra, Maddur, Entrepreneur

Sri. Vinay and Sri. Harish, Rearer, Adigondanahalli

Sri. Srivatsa, Tumakuru, Entrepreneur

Sri. Ramesh Hoskote, Rearer

Sri. Anil, Bommachanahalli, Rearer

Sri. T. Krishna, Palamner, Chawki Rearing Center

Sri. Eduru Babu, Palamner, Rearer

Innovations discussed in the webinar

1. Tractor mounted shoot harvesting machine
2. Auto controlled Room Heaters and Humidifiers
3. Auto controlled environment management systems for rearing rooms
4. Auto mobile alarming equipments

5. Bed disinfectant dusting tools to use in rearing
6. Chawki rearing tray/crate washing machine
7. Cocoon harvesting and deflossing machine for plastic corrugated and rotary mountages

Webinar No.16: Farmers innovations for Sustainable Sericulture Part-2 (12-3-2022)

Resource person

Technical presentation by Dr. Madhusudan, Scientist, CSR&TI, Mysuru

Panel Members

Sri. Keshavarao, Mysuru, Enterprenure

Sri. K. Shiva, Coimbatore, Farmer

Sri. Puttaraju, Chikkaballapur, Farmer

Sri. Ramesh, Hoskote, Farmer

Sri. B. M. Nagaraju, Donnenahalli, Farmer

Sri. Keshavaraju, T. Narasipura, Farmer

Sri. Navab, Chikkabalapur, Entrepreneur

Sri. P. K. Ramesh Kumar, Udumulapet, Entrepreneur

Sri. Maruthi Manchi, Molakalmuru, Weaver

Innovations discussed in the webinar

1. Self mounting rotary mountages
2. Production, usage and maintenance of Heaters and Humidifiers for better long term usage
3. Development of inter cultivator using old scooter engine and scrap iron materials
4. Development of tractor mounting different gadgets and accessories to use in mulberry gardens
5. Production of cut mulberry leaf sheaving machine to separate cut leaf and shoot bits
6. Development of new jacquard machines for hand looms.

SAI Events

Dr. B.S. Angadi, Director SAI, and Dr. E. Muniraju, Joint Secretary, SAI, made a detailed presentation about the World Bank aided project **'Expansion of Bivoltine Sericulture in Tamil Nadu'** conceptualized by SAI, on 29-03-2022 at Secretariat, Chennai.

Sri Dharmendra Pratap Yadav, I A S, Principal Secretary to Government of Tamil Nadu, Handlooms, Handicrafts, Textiles and Khadi Department, Ms. Shanti, Director, Department of Sericulture, Government of Tamil Nadu, and other senior officers were present during the presentation.

SAI, Mysuru Zonal meeting was held on 25-03-2022 at CSR&TI, Mysuru. Dr. Babulal, Director, CSRTI, Mysuru, Sri N Y Chigari, Sri K Chandrashekar, Sri Y H Hanumanthegowda, Sri Channegowda, Sri S B Naveen and Sri M A Khan. Many senior scientists of CSR&TI, Mysuru also participated in the meeting.

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